

GAO

Fact Sheet for the Honorable  
Lowell P. Weicker, Jr.  
United States Senate

March 1987

## WEAPON SYSTEMS

Status of the Army's  
Light Helicopter Family  
Program

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National Security and  
International Affairs Division

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March 13, 1987

The Honorable Lowell P. Weicker, Jr.  
United States Senate

Dear Senator Weicker:

At your request, we have been reviewing the Army's Light Helicopter Family (LHX) program. In February 1987, we briefed your representative on our work up to that time on such matters as the program's costs, affordability, technical performance, and program alternatives. This fact sheet updates that information. We will continue to review the LHX program and will report the results to you at a later date.

The LHX program is a major Army initiative to replace its aging fleet of light helicopters. Since our report to you last year,<sup>1</sup> the program has undergone several changes. In particular, the Army has realized that, based on information developed during the year, the original goals it set for the program are not likely to be achieved. It has set more realistic program goals that still represent a great challenge. The LHX is approaching a key milestone scheduled for April 1987--the full-scale development decision. At that point, program cost estimates are to be verified, requirements solidified, and a formal cost-effectiveness analysis of program alternatives completed. More detailed information is included in appendix I.

In conducting our review, we discussed the LHX program with officials of the LHX program office at the U.S. Army Aviation Systems Command, St. Louis, Missouri, and at the Army

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<sup>1</sup>WEAPON SYSTEMS: Issues Concerning the Army's Light Helicopter Family Program, GAO/NSIAD-86-121, May 22, 1986.

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Aviation Center, Fort Rucker, Alabama. We also solicited the views of all the prime contractor teams participating in the program.

Should you desire additional information on our work, please contact me on (202) 275-4133.

Sincerely yours,

A handwritten signature in cursive script, reading "Mark E. Gebicke".

Mark E. Gebicke  
Associate Director

ARMY LIGHT HELICOPTER FAMILY

The Army's Light Helicopter Family (LHX) is to be a fleet of new helicopters with the advanced capabilities to perform several new missions, such as air-to-air combat and fighting across battle lines as well as existing antiarmor and utility missions. The LHX will be the Army's most technically advanced helicopter if it is to perform these missions and survive against the expected threat weaponry of the 1990s, while meeting its other requirements of light weight and being a single seat helicopter. It was conceived to replace the Army's current fleet of light helicopters--the AH-1, UH-1, OH-6, and OH-58--which the Army considers too obsolete to meet the demands of the future battlefield. The heart of the LHX is its avionics, which are as sophisticated as the Air Force's Advanced Tactical Fighter now in development. In addition, the LHX airframe will be made from lightweight composite materials, rather than from metal. The program is managed by the Army's Aviation Systems Command in St. Louis, Missouri.

The LHX's original goals have proven too optimistic: projected weight and costs are higher, performance expectations are lower, and the feasibility of a single seat version of the LHX remains undemonstrated. The Army is currently assessing its cost effectiveness, and reassessments will be necessary if the program moves further away from its goals. Another concern is the program's affordability. At projected total quantities and rate of production, the LHX will dominate the Army's aircraft procurement budget in the mid-1990s and beyond. The Army already faces potential funding shortfalls during those years, and whether enough funds can be set aside for the LHX remains to be seen.

SYSTEM DESCRIPTION

The LHX will consist of two versions with many common components--the Scout/Attack (SCAT) and the utility. The SCAT will perform attack and armed reconnaissance missions and will replace the AH-1, OH-58, and OH-6 helicopters. The SCAT is the more sophisticated of the two, and it is to be a single seat helicopter whose armament will include Hellfire antitank missiles, air-to-air missiles, and a gun system. The utility version will replace the UH-1 and will have two seats; it will carry air-to-air missiles for self-defense, and it will not have the target acquisition equipment of the SCAT. The Army plans to buy 2,000 SCATs and 2,500 utility helicopters. The program is currently in advanced development, and the full-scale development decision (milestone II) is scheduled for April 1987. Current plans call for contractor teams to compete throughout full-scale development.

COST

There have been numerous changes in the LHX's estimated costs since the program's inception in 1983. The Army's current plan is to procure approximately 4,500 LHX helicopters at a total acquisition cost of \$44.9 billion in 1986 dollars (\$66 billion in escalated dollars), according to the LHX Program Office's Baseline Cost Estimate. As of February 1987, no Army or the Department of Defense (DOD) estimates, independent of the program office's, had been completed. They are scheduled to be completed before the full-scale development decision.

The changes in estimated LHX costs are due primarily to changes in mission equipment and acquisition strategies. Table I.1 shows the original 1983 estimates, 1986 estimates at the time we completed our first review of the LHX program, and February 1987 estimates.

Table I.1: Cost Estimates for the LHX

	<u>1983</u>	<u>May</u> <u>1986</u>	<u>February</u> <u>1987</u>
	----- (billions) -----		
Research and Development			
1986 dollars	\$2.7	\$ 2.7	\$ 3.8
Escalated dollars	3.1	3.2	4.4
Procurement			
1986 dollars	39.2	38.0	41.1
Escalated dollars	<u>79.9</u>	<u>57.4</u>	<u>61.6</u>
Total			
1986 dollars	\$41.9	\$40.7	\$44.9
Escalated dollars	83.0	60.6	66.0

The increase in Research and Development costs is due mainly to changes in the acquisition strategy suggested by DOD's Defense Science Board, which extended the LHX team competition through full-scale development to include a competitive flight test. The previous strategy had called for selecting one contractor before beginning prototype fabrication. Also contributing to cost increases were the Army's decisions to build a two-seat SCAT prototype in addition to a one-seat prototype.

The Army set cost goals (in 1984 dollars) early in the program for the LHX in terms of unit flyaway costs. Flyaway costs are a subset of procurement costs and exclude items such as initial spares and repair parts. In May 1986, the goals were \$6 million for the SCAT, and \$4 million for the utility, for an average unit

cost of \$5.3 million. As of February 1987, unit flyaway costs had increased 15 percent for the SCAT and 35 percent for the utility version. The effects of these increases on total estimated procurement costs were reduced somewhat by a decrease in the total buy and a change in the mix of SCATs and utility versions. As of May 1986, 5,023 helicopters were to be procured, made up of 3,072 SCATs and 1,951 utility versions; as of February 1987, 4,500 helicopters were to be procured, made up of 2,000 SCATs and 2,500 utility versions. Table I.2 shows the recent changes in the estimated unit flyaway costs and unit procurement costs.

Table I.2: Unit Cost Changes

	<u>May 1986</u>	<u>February 1987</u>
	----- (millions) -----	
Procurement unit costs (fleet avg.)		
1984 dollars	\$ 7.1	\$ 8.6
Escalated dollars	11.4	13.7
Flyaway unit cost (1984 dollars)		
SCAT	\$ 6.0	\$ 6.9
Utility	4.0	5.4
Fleet average	5.3	6.1

SCAT unit costs increased primarily because of the need to increase aircraft weight to satisfy mission requirements. The overall reduced number of aircraft, and particularly the procurement of fewer SCATs, has also increased SCAT unit costs. The utility version's unit cost increase is due mainly to the Army's decision to outfit it with the same mission equipment as the more expensive SCAT with some exceptions, such as equipment directly related to target acquisition and weapon fire control.

In order to buy 4,500 aircraft and replace the current fleet as quickly as possible, the Army plans to procure as many as 480 LHX aircraft per year. In those peak production years, the Army estimates the LHX program could require up to \$6 billion a year (in escalated dollars). During this same period, many other Army systems will be competing for the limited amount of funds that will be available for programs funded from the Army's procurement appropriation.

A preliminary Army analysis shows that assuming no real growth annually in available funds, the procurement account may be short over \$100 billion cumulatively from fiscal years 1987 through 2000. Peak LHX production, as planned, will occur in the late 1990s. With such large funding shortages being projected, it seems likely

the Army may face either cancelling or stretching out some other weapon system programs if it is to buy the LHX at the planned rate.

In the area of operation and support costs, estimated savings are less than expected. Originally, the LHX fleet's operation and support costs were expected to be 40 to 50 percent less than those of the fleet of helicopters it was to replace. Currently, such savings are estimated at 20 to 25 percent. Basically, the lower expectations are due to (1) the availability of better operation and support cost data on the existing fleet, showing it to be less costly to operate than estimated, (2) more realistic estimates of the LHX's reliability, based on additional analyses, and (3) increased spare parts costs, which reflect the greater costs now estimated for LHX production helicopters.

### SCHEDULE

The LHX is currently scheduled for a full-scale development decision (milestone II) in April 1987, followed by development contract awards beginning in January 1988. The Army plans a competitive development, awarding contracts to two teams, each consisting of two contractors. Development contracts will be awarded in three phases, each consisting of 18 to 24 months of effort. The winning team is to be selected before low-rate initial production (milestone III), and the two members of the winning team will be split to compete for shares of full-scale production (milestone III A). The Army will assess results at the end of each phase and determine whether program changes should be made, including the possibility of an early selection of a single team.

Since the LHX program began in 1983, its development and procurement schedules have changed substantially and frequently. Table I.3 shows six of the revisions to the LHX's key milestones that have occurred since 1983.

Table I.3: LHX Schedule Changes

<u>Schedule date</u>	<u>Milestone II</u>	<u>Milestone III</u>	<u>Milestone IIIA<sup>a</sup></u>	<u>Fielding date</u>
Oct. 1983	Oct. 1986	Not Avail.	Not Avail.	Sep. 1994
May 1984	Nov. 1985	Apr. 1990	Dec. 1991	Sep. 1992
Sep. 1984	June 1986	June 1991	Not Avail.	Sep. 1993
Sep. 1985	Apr. 1987	May 1993	June 1995	Oct. 1995
Feb. 1986	Oct. 1987	Jan. 1994	Jan. 1996	May 1996
Oct. 1986	Jan. 1989	Sep. 1995	Sep. 1997	June 1998
Nov. 1986	Jan. 1988	June 1993	Nov. 1995	Nov. 1995

<sup>a</sup>Only the last two schedules show a discrete milestone IIIA decision that would precede splitting the winning team for the rest of production. The dates shown for the earlier schedules represent when the team was to be split.

The major factor causing schedule delays was the Army's difficulty in funding the program. Other factors include difficulties in (1) finalizing the Army's Required Operational Capability document and its Request for Proposal to industry, (2) deciding what mission equipment would be needed, and (3) reacting to comments from industry on the feasibility of the requirements. The schedule was also restructured to reflect DOD's Defense Science Board's recommendations to extend competition through prototype flight tests.

While schedule changes have substantially delayed starting full-scale development and the plans for fielding the aircraft, the additional time is providing an opportunity to continue to refine the state-of-the-art technologies planned for the LHX.

#### PERFORMANCE

The LHX's requirements to perform a variety of missions with a single seat aircraft are demanding from a technology standpoint. Meeting these requirements is even more difficult given the Army's goals for unit flyaway cost, operation and support cost, and aircraft weight. Trade-offs are still being made between performance requirements and cost and weight goals. Therefore, it is too early to evaluate how well or if the LHX will meet its performance requirements. However, progress to date has indicated that original performance expectations and cost estimates were too optimistic and will not be met.

On the basis of LHX advanced development efforts to date, the Army concluded that the feasibility of having a single pilot fly,



maneuver, and control a helicopter had been demonstrated. However, the feasibility of a single pilot also performing mission-related tasks at the same time, such as targeting, had not been demonstrated. The Army learned that the performance necessary from the optical sensors to fully automate the targeting function for the single pilot may not be available for application to the initial LHX helicopters. The Army considered developing a radar sensor to complement the optical sensors available for the LHX to achieve full automation, but determined the additional equipment to be too costly and heavy for inclusion on the initial LHX helicopters. These factors, combined with an assessment by the Defense Science Board, have raised some doubts about achieving the single seat objective and have led to the addition of a two-seat version to the development program.

In addition to automated targeting technologies, other areas where performance expectations have been lowered include the quality of the visual displays, digital map, automatic hover-hold, and aircraft survivability equipment. Performance reductions reflect tradeoffs due to cost, weight, technical risk, or a combination of these. The original weight goal for the one-seat SCAT was 8,500 pounds. Currently, the goal for the same version is 9,500 pounds. A two-seat version would weigh more.

#### ALTERNATIVES

The Army is currently examining alternatives to developing a new LHX helicopter in its Cost and Operational Effectiveness Analysis. This analysis is scheduled for completion by the full-scale development decision in April 1987. The alternatives under consideration are: (1) modifying the existing AH-1, UH-1, and OH-58A/C helicopters with reliability, availability, maintainability, and safety improvements, (2) modifying the existing AH-64, UH-60, and OH-58D helicopters, with reliability, availability, maintainability, safety, and performance improvements, working together with the S-76 commercial helicopter as a utility aircraft, and (3) developing a new tilt rotor aircraft. While modifying existing helicopters will cost less, none will meet all LHX requirements.

#### FUNDING

The Senate report accompanying the fiscal year 1987 Appropriations bill required the DOD Cost Analysis Improvement Group to certify the LHX's unit cost estimate before any fiscal year 1987 research and development funds for technology risk reduction would be released. This certification has not yet been made, and the fiscal year 1987 funds have not been released for obligation, although risk reduction efforts must be substantially

completed before full-scale development contracts begin in January 1988. The Army has requested the Congress to release \$25 million of the \$44 million appropriated for fiscal year 1987 to continue the program through May 1987, when the Army's cost estimate is scheduled to be completed and certified. The House of Representatives agreed to release the funds, but the Senate had taken no action as of January 31, 1987. The Army considers the fiscal year 1987 funding of \$44 million to be adequate and the dollars programmed for fiscal years 1988 and 1989 to be sufficient for the first years of full-scale development.